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Identification and Significance of Innovation

GOAL: Improved thermal management and life support for exploration space suits and spacecraft

Approach: Space Evaporator Absorber Radiator (SEAR)

- *Space Water Membrane Evaporator (SWME) cools circulating water by evaporation through hydrophobic porous hollow fibers
- *LiCl Absorber Radiator (LCAR) absorbs water vapor and radiates heat
- *LiCl absorption boosts radiating temp by 30°C, reduces radiator size
- *Minimizing water venting is a key requirement. Creare's LCAR and SEAR technologies have already demonstrated this capability
- *Aim is to demonstrate SEAR on board the ISS using an EMU

Innovation: A multifunctional LCAR that doubles as a protective housing for the Advanced PLSS

- *Carbon composite honeycomb structure for high strength

Estimated TRL at beginning and end of contract: (Begin: 4 End: 5)

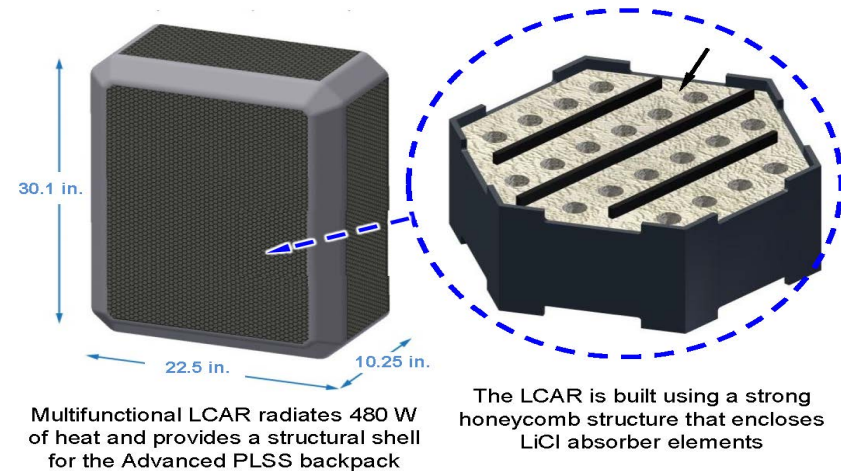
Technical Objectives and Work Plan

OBJECTIVES---

- 1) LCAR: Compact, lightweight, high cooling density
 - *Meet packaging requirements for PLSS backpack
 - *Reject heat and minimize water venting
- 2) Flight experiment development in Phases I and II
 - *Designed to demonstrate key operational features in zero gravity
 - *Minimize crew time needed to run the experiment
 - *Operate at prototypical power levels

WORK PLAN---

- *Build and test a honeycomb LCAR
- *Design the prototype honeycomb LCAR
- *Design the flight test system



NASA Applications

- 1) Future manned space exploration
- 2) Thermal control systems for exploration space suits
 - *Modified system can also be used for heat-driven water vapor management for spacecraft and manned rovers
- 3) Thermal control systems for exploration spacecraft
 - *Boost heat rejection temperature and store thermal energy for spacecraft with highly variable thermal environments

Non-NASA Applications

Terrestrial applications: Heat driven dehumidifiers

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